San Joaquin Tributaries Authority

Comments on the Substitute Environmental Document and Proposed Flow Alternative Relative to San Joaquin Basin Fishery Resources

State Water Resources Control Board
SED Workshop: March 21, 2013

Doug Demko

Purpose of Lower San Joaquin River Flow Objective

- **Provide reasonable protection to fish and wildlife**

- **Question for the State Water Board:**

  - ***What are the measurable benefits of the proposed 35% unimpaired flows for salmon?***

What are benefits to each “function”?

- Floodplain Habitat
- Geomorphology
- Nutrients and Food
- Velocity and Stage
- Contaminants
- Dissolved Oxygen
- Disease
- Turbidity
- Water Temperature
- Predation

Function: Floodplain Habitat

- First and perhaps most important is floodplain habitat, critical rearing and food production habitat for juvenile salmon
- Well recognized that due to changes in habitat over last 100 years that shallow water habitat is severely limited from our terminal dams to the bay
- This issue has been well studies and the ***SED correctly identified that the preferred flow alternative will not make more floodplain habitat***
- So, for the 35% flow alternative, there are **no measurable benefits** to floodplain habitat for salmon

Function: Floodplain Habitat

River	Flow to Create Floodplain Habitat (cfs)	Flow Provided by Preferred Alternative (35% UIF) (cfs)
Stanislaus	10,000+	2,500
Tuolumne	4,000 – 6,000	3,500
Merced	3,000 – 5,000	2,000

- **Data from SED shows levels of flow needed to create floodplain habitat, which demonstrates the need to focus on habitat restoration to make floodplains, not flow**
- **OID and USFWS recently completed project where floodplain habitat was created by engineering habitat down to contemporary flows**
- **Result was new spawning and rearing habitat that will be inundated and useful to fish under most years, rather than rare years.**

SWRCB SED App. C, pages 3-46 to 3-47

Function: Geomorphology

- The SED correctly concludes that the preferred 35% alternative will also not result in bed mobilization in any of the tribs, which is important for maintenance of salmon spawning habitat

- The result is no measurable benefits to salmon spawning habitat from the preferred 35% flow alternative

Function: Geomorphology

River	Minimum Geomorphology Flows (cfs)	Flow Provided by Preferred Alternative (35% UIF) (cfs)
Stanislaus	5,000 – 8,000	2,500
Tuolumne	7,050 – 9,800	3,500
Merced	4,800	2,000

- **The high geomorphic flows for all the tribs highlight the need for restoration alternatives such as constant gravel replenishment and physical cleaning**
- **Significant amounts of gravel have been minded from the tribs of the last century, and dams prevent replenishment**
- **Constant gravel addition is a viable form or channel maintenance, certainly more so that waiting for the occasional geomorphic flows**

Function: Nutrients and Food

- The SED does not identify food resources as a problem
- It also states it is unlikely that food productivity would be increased even with 40% unimpaired flows
- No evidence food resources are a limiting factor
- So, no measurable benefit to food production or salmon from 35% flow alternative

Function: Velocity and Stage in San Joaquin River

- SED has no analysis on effects of flow on velocity and stage on salmon in SJR
- As a result we don't know the extent velocity and stage are increased at the 35% alternative
- However, in 2001 Baker and morhardt analyzed years of SJB CWT data concluded that higher flows did not decrease travel times and speed passage
- So, unsure of measurable benefit to velocity and stage from 35% flow alternative, probably no benefit to fish

Function: Velocity and Stage in Delta

- SED has no analysis on impacts of flow on velocity and stage in Delta
- Paulsen determined in 2008 San Joaquin River flows have little influence on velocities in the South Delta downstream of HORB
- Tidal influence and exports dominate
- So, 35% alternative has no measurable benefit to velocity or stage down from HORB, and no benefit to fish

Paulsen et al. 2008: *Effect of Increased Flow in the San Joaquin River on Stage, Velocity, and Water Rate, Water Years 1964 and 1988.*

Function: Contaminants

- SED infers higher flows may dilute suspended contaminants, but also notes issue not well understood and higher flows can lead to increases in contaminants (see McBain and Trush 2002)
- Contaminants do not appear to be a major problem for FRCS survival
- There is uncertainty whether higher flows will increase or decrease suspended contaminants
- So, 35% alternative has no measurable benefit to contaminants, and potentially detrimental

Function: Dissolved Oxygen

- The SED does not identify that baseline dissolved oxygen concentrations are harmful to juvenile salmon, or that they would benefit from increased dissolved oxygen
- Dissolved oxygen levels from February to do not appear to be a problem
- So, 35% alternative provides no measurable benefit dissolved oxygen, or to salmon

Function: Disease

- Significant unknowns about how diseases and causative agents influence salmon health and survival in the SJB
- Some causative agents may be present, but there may be no outward symptoms and presence does not lead to reduced health or death
- Some diseases (e.g. BKD) are more prevalent in cold water
- Most concerning disease issue in SJB is presence of causative agent of PKD in large percentage of smolts from Merced River
- Unknown how diseases can be mediated by changes in environment, such as hatchery practices, flow, temp, etc.
- So without clearer understanding of impacts of disease, **can't say that 35% alternative will have measurable benefits** to salmon

Function: Turbidity

- The SED concludes that the proposed flow objectives will not create turbidity
- Turbidity can be beneficial to juvenile salmon by decreasing predation
- So, 35% alternative provides no measurable benefit for salmon through the creation of turbidity

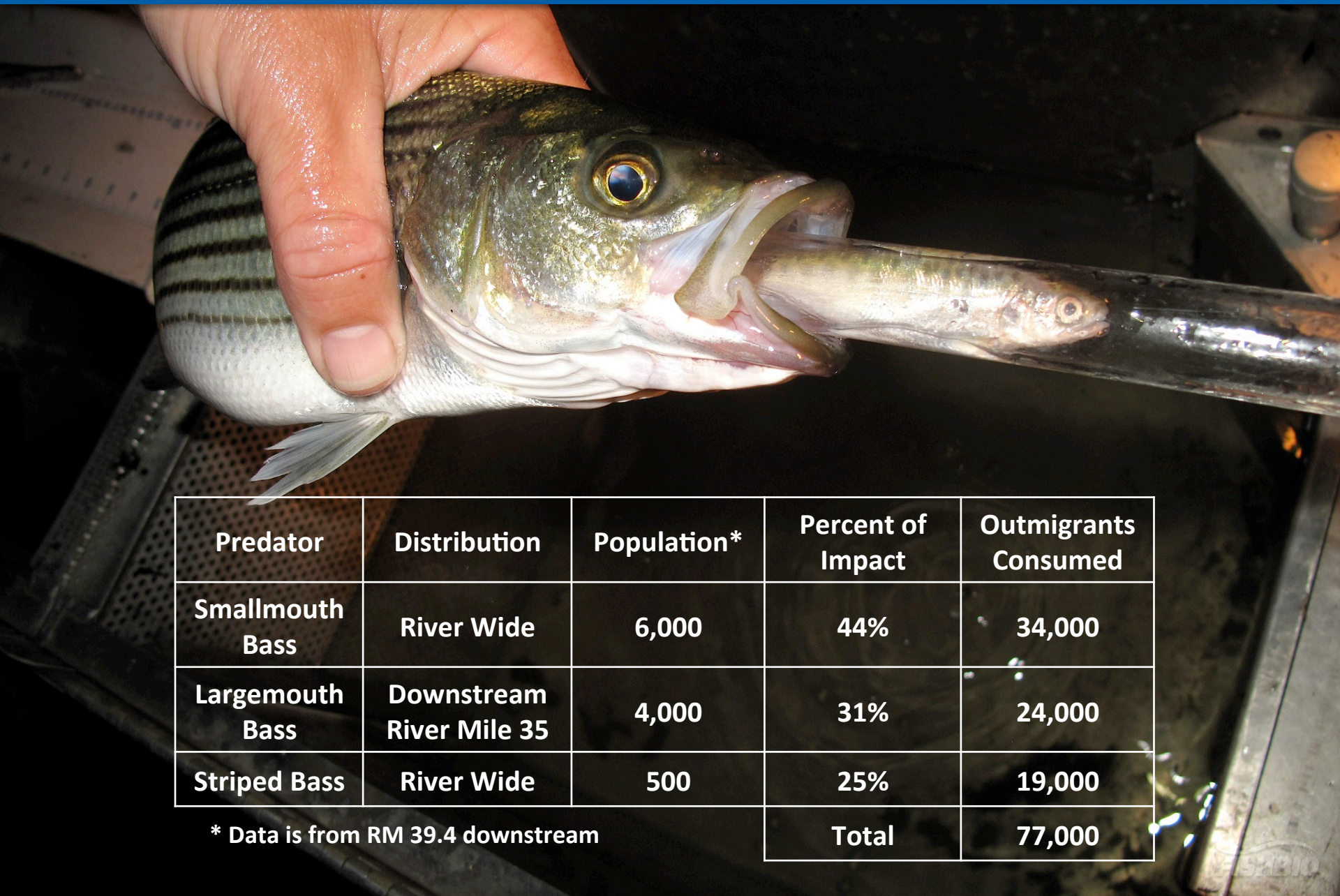
Function: Water Temperature

- Challenges evaluating SED temperature analysis
- What criteria were used to compare alternatives?
  - CDFW or USEPA?
  - Optimal, suboptimal, lethal, or all?
  - Monthly averages, maximum daily, or 7DADM?
  - Time periods?
  - Locations?
- Will proposed flow changes reduce temps and to what extent?
- What is the biological significance of potential changes in water temperature?

Function: Predation

- **The SED states:**
  - ***"…potential changes in predator-prey interactions that could result from altered flow and temperature conditions."*** **(p. 7-115)**
- **Will proposed flow changes reduce predation, and if so to what extent?**
- **Magnitude of predation issue still not acknowledged**

2012 Tuolumne River Predator Abundance and Impact



Predator	Distribution	Population*	Percent of Impact	Outmigrants Consumed
Smallmouth Bass	River Wide	6,000	44%	34,000
Largemouth Bass	Downstream River Mile 35	4,000	31%	24,000
Striped Bass	River Wide	500	25%	19,000
			Total	77,000

* Data is from RM 39.4 downstream

2012 Tuolumne River Predation Study

- Total predation mortality potentially 96% of juvenile Chinook outmigrants in 2012
- Only 3,000 Chinook estimated to survive 25 mile migration between RST's
- During 2007-2011 estimated losses in all water year types ranged from 76% to 98%

Recent VAMP Results and Chinook Survival in Delta

- **Salmon smolt survival from Mossdale to Chipps Island was 2% during 2011 with flows of approximately 5,000 cfs at Vernalis** (SJRGA 2013)

- **Since 2003, survival through the Delta has consistently been ≤ 12%, while flows at Vernalis ranged between 2,000 cfs and 27,000 cfs** (SJRGA 2007 and SJRGA 2013)

- **VAMP peer review found that Delta hydraulics and impacts of predation appear to affect survival rates more than river flow** (Hankin and others 2010)

Predator Suppression Works

"Sport anglers removed approximately 155,000 pikeminnow from the Columbia last year. The sport reward program has reduced pikeminnow predation on juvenile salmon by roughly 40 percent since 1990. The Action Agencies continue to focus on controlling predation by native and non-native species."

Sept 28, 2012
Joint Press Release: USBR, U.S. Army Corps of Engineers, Bonneville Power Administration
New report charts progress to protect salmon and steelhead
Spawning fish find more habitat, while tests show most fish getting past dams safely

Measurable Benefits of 35% UIF on Fish Functions

Function	Benefit?
Provide more floodplain habitat	**NO**
Increase gravel mobility	**NO**
Provide more food	**NO**
Increase velocities downstream of HORB	**NO**
Increase dilution of contaminants	**NO**
Improve D.O.	**NO**
Decrease disease risk	**NO**
Provide more turbidity	**NO**
Provide temperature benefits	**NO**
Reduce predation	**NO**
Overall Measurable Benefits?	**NO**

Apart from Functionality: DFG Salmon Model

- The State Water Board has used the CDFG model as justification for the relationship between flow and salmon

- Model v 1.6 was run using escapement, observed daily flows at Vernalis, and daily estimated 35% unimpaired flow from the past ten years (2003 – 2012)

Predicted Change in Adult Salmon Abundance

If the CDFG model works, the proposed flow does not work

Flow Yr	WY Type	Avg Flow at Vernalis 3/15-6/15		Predicted Cohort Abundance	
		Observed	35% Unimpaired	Observed	35% Unimpaired
2003	BN	2,467	5,001	11,670	15,245
2004	D	2,575	3,937	12,039	13,826
2005	W	10,487	9,786	23,688	22,951
2006	W	22,604	17,112	60,623	28,094
2007	C	2,473	2,671	9,528	9,661
2008	C	2,290	3,161	8,367	9,185
2009	BN	1,600	4,313	7,010	9,990
2010	AN	4,122	5,411	10,002	11,486
2011	W	17,445	13,843	40,528	29,045
2012	D	2,378	2,590	9,480	10,274
Average		6,844	6,783	19,294	15,976

The model predicts (on average) lower returns under 35% UIF

Water Cost vs Fish Gain

Water used under 35% UIF and predicted fish gain under CDFG model 1.6

Flow Year	WY Type	Water Cost (acre-ft)	Net Benefit (# fish)
2003	BN	456,120	3,575
2004	D	245,160	1,787
2007	C	35,640	133
2008	C	156,780	818
2009	BN	488,340	2,980
2010	AN	232,000	1,484
2012	D	38,160	794
AVERAGE		236,029	1,653

Actions that Scientific Evidence Supports

- **Install HORB**
  - Increase salmon smolt survival through Delta
- **Suppress Predators**
  - Increase salmon smolt survival through predator suppression in lower tribs and Delta
- **Improve Habitat**
  - Restore habitat at contemporary flow levels
- **Reduce Ocean Harvest**

SRFC Stock Status

"The SAFE document reported a 2010 to 2012 geometric mean spawning escapement of 161,471 for SRFC, well above the S_{MSY} value of 122,000. SRFC are therefore rebuilt. No Chinook stocks were subject to overfishing, or met the criteria for approaching an overfished condition (Table V-4)."

Pacific Fishery Management Council [PFMC]. 2013. Preseason Report I Stock Abundance Analysis and Environmental Assessment Part 1 for 2013 Ocean Salmon Fishery Regulations. February 2013.

Thank You

Comments on the Substitute Environmental Document and Proposed Flow Alternative Relative to San Joaquin Basin Fishery Resources

Doug Demko / FISHBIO

www.fishbio.com
dougdemko@fishbio.com